ICDEA 2016

The 22nd International Conference on Difference Equations and Applications

Osaka, Japan

July 24 to 29, 2016

Abstracts Book

Program of ICDEA2016

Sunday, July 24	
Time	**I-site Namba 2F**
16:00-17:00	**Registration**

Monday, July 25		
Time	**I-site Namba 2F**	
08:45-09:30	**Registration**	
	Conference Room 2 + Room 3	
	Chair	**Speaker and Title**
09:30-09:40	**Yamaoka**	**Opening**
09:40-10:40	**Cushing**	**Saber Elaydi (USA),** Global Dynamics of Difference Equations: Applications to Population Dynamics
10:40-11:00	**Coffee Break**	
11:00-12:00	**Schreiber**	**Ryusuke Kon (Japan),** Bifurcations in nonlinear Leslie matrix models
12:00-14:00	**Lunch**	
Session 1	**Conference Room 3**	
14:00-14:25	**Kon**	**Youssef Raffoul (USA),** Boundedness of Solutions in Almost Linear Volterra Difference Equations Using Fixed Point Theory and Lyapunov Functionals
14:25-14:50	**Kon**	**Yukihiko Nakata (Japan),** Stability of a logistic equation with multiple delays
14:50-15:15	**Raffoul**	**Kaori Saito (Japan),** On the Stability of an SIR epidemic discrete model with a delay
15:15-15:40	**Raffoul**	**Inese Bula (Latvia),** About neuron model with period two and three internal decay rate
15:40-16:00	**Coffee Break**	

Monday, July 25

Session 1	Conference Room 3	
Time	**Chair**	**Speaker and Title**
16:00-16:25	Nakata	**Shinji Nakaoka (Japan),** Exploration of combinatorial emergence in coupled boolean network systems
16:25-16:50	Nakata	**Mansoor Saburov (Malaysia),** Applications of non-autonomous discrete dynamical systems into nonlinear consensus problems
16:50-17:15	Nakaoka	**Kuo-Chih Hung (Taiwan),** Allee effect and its applications
17:15-17:40	Nakaoka	**Wirot Tikjha (Thailand),** Prime period 4 behavior of certain piecewise linear system of difference equations where initial condition are some points in positive x-axis
18:30-20:30	**Welcome Party**	

Session 2	Conference Room 1	
Time	**Chair**	**Speaker and Title**
14:00-14:25	Nishimura	**Aiko Tanaka (Japan),** An evolutionary game model of families' voluntary provision of public goods
14:25-14:50	Nishimura	**Takashi Honda (Japan),** Operator theoretic phenomena of the Markov operators which are induced by stochastic difference equations
14:50-15:15	Nishimura	**Ryoji Hiraguchi (Japan),** On a solution path to the optimal growth model with multiplicative habits
15:15-15:40	Nishimura	**Takuma Kunieda (Japan),** Asset Bubbles, Financial Crisis, and Unemployment
15:40-16:00	**Coffee Break**	
16:00-16:25	D'Aniello	**Hikmet Kemaloglu (Turkey),** Uniqueness of Potential Function in Sturm-Liouville Difference Equation
16:25-16:50	D'Aniello	**Yan-Hsiou Cheng (Taiwan),** Eigenvalue estimates for the Sturm- Liouville equation
16:50-17:15	Kemaloglu	**Petr Zemánek (Czech Republic),** Self-adjoint extensions of minimal linear relation associated with discrete symplectic system
17:15-17:40	Kemaloglu	**Nobuyuki Higashimori (Japan),** Convergence of finite difference schemes applied to the Cauchy problems of quasi-linear partial differential equations of the normal form
18:30-20:30	**Welcome Party**	

Applications of non-autonomous discrete dynamical systems into nonlinear consensus problems

MANSOOR SABUROV

Department of Computational & Theoretical Sciences
International Islamic University Malaysia
Kuantan, 25200, Pahang, Malaysia
msaburov@gmail.com

Historically, an idea of reaching consensus through repeated averaging was introduced by DeGroot (see [1, 3]) for a structured *time-invariant* and synchronous environment. Since that time, the consensus which is the most ubiquitous phenomenon of multi-agent systems becomes popular in various scientific communities, such as biology, physics, control engineering and social science. Roughly speaking, a trajectory of a row-stochastic matrix presents DeGroot's model of the structured *time-invariant* synchronous environment. In [2], Chatterjee and Seneta considered a generalization of DeGroot's model for the structured *time-varying* synchronous environment. A trajectory of a sequence of row-stochastic matrices (a non-homogeneous Markov chain) presents the Chatterjee-Seneta model of the structured *time-varying* synchronous environment.

In this paper, we shall consider *a nonlinear model of the structured time-varying synchronous environment* which generalizes both DeGroot's and the Chatterjee-Seneta models. Namely, by means of multidimensional stochastic hypermatrices, we present an opinion sharing dynamics of the multi-agent system as a trajectory of non-autonomous polynomial stochastic operators (nonlinear Markov operators). We show that the multi-agent system eventually reaches to a consensus under suitable conditions.

References

[1] R. L. Berger, *A necessary and sufficient condition for reaching a consensus using DeGroot's method*, J. Amer. Stat. Assoc. 76 (1981) 415–418.

[2] S. Chatterjee and E. Seneta, *Towards consensus: some convergence theorems on repeated averaging*, J. Appl. Prob. 14 (1977) 89–97.

[3] M. H. DeGroot, *Reaching a consensus*, J. Amer. Stat. Assoc. 69 (1974) 118–121.

This work was supported by Ministry of Higher Education (MOHE) grant FRGS14-141-0382.